

Applicant: Joseph A. Kwak
Application No.: 10/084,043

REMARKS

Claims 1-6 and 10 are currently pending in this application. The Examiner has rejected Claims 1-6, and 10 under 35 U.S.C. §103(a). The Applicant has amended claim 1. The amendment is fully supported in the specification and no new matter has been added.

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35 U.S.C. §103(a) – Claims 1, 2, 5, 6 and 10

The Examiner rejected claims 1, 2, 5, 6 and 10 under 35 U.S.C. §103(a) as being unpatentable over Schramm et al. (U.S. Ref. No. 6,208,663) in view of Malkamaki et al. (U.S. Ref. No. 6,735,180) and Fong et al. (U.S. Ref. No. 6,760,860). In making the rejection, the Examiner stated:

Regarding claims 1 and 10, Schramm discloses, in Figs. 3 and 5, a method for adjusting data modulation at base station, comprising:

receiving data at a transmitter for transmission (a radio base station 22);

formatting the received data into packets for transmission to the receiver, each packet having a particular encoding/data modulation (a radio base station 22; column 5, lines 46-58);

transmitting the packets (column 5, lines 25-45);

monitoring a return channel for receipt of acknowledgment for each packet that the packet has been received (column 7, lines 39-53; column 8, lines 37-42);

retransmitting that received packet at the transmitter, if an acknowledgment for that packet is not received (column 7, lines 39-53).

Further, Schramm discloses that the ARQ protocol is the RLC layer. An LLC frame to be transmitted by RBS is segmented into RLC blocks to the mobile station through the physical layer (data is received from a higher layer ARQ mechanism).

Schramm does not disclose that data is formatted by a physical layer transmitter and generating an acknowledgment at the physical layer and physical layer ARQ mechanism operates transparently with respect to the higher layer ARQ mechanism.

However, higher layer ARQ mechanism is well known in the art.

Malkamaki teaches a fast feedback scheme for a fast physical layer hybrid ARQ for data transmitted in the downlink direction. Further Malkamaki teaches that one way to speed up the whole process is to generate the feedback data in physical layer of the receiver. Similarly of the transmissions should be generated at the physical layer of the transmitter. Alternatively, the feedback and the

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retransmission can also be generated in a layer which is co-located with the physical layer (column 1, lines 54-60).

Fong teaches a dual ARQ type arrangement (see Fig 2 and abstract), which is layer 1 and layer 2 both support ARQ operation (column 2, lines 45-53 (as in claim 1)).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schramm's ARQ method to incorporate the teachings from Malkamaki of a physical layer ARQ mechanism and a dual type arrangement from Fong, the motivation being that the ARQ system will be more reliable by eliminating any long delay between the higher layer and the physical layer.

Regarding claim 2, Schramm discloses the method wherein the particular encoding/data modulation is forward error correction FEC encoding/data modulation (column 7, line 54-column 8, line 11).

Regarding claim 5, Schramm discloses the method wherein the acknowledgments are transmitted on the fast feedback channel using a CDMA air interface (column 4, lines 49-56).

Regarding claim 6, Schramm discloses the method further comprising transmitting a negative acknowledgment, if that packet has an unacceptable error rate (column 7, lines 39-45).

In order to establish a *prima facie* case of obviousness, the Examiner must demonstrate there is a suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine the reference teachings. Furthermore, the prior art references must teach or suggest all of the claim features. The Examiner is not free to pick bits and pieces from the prior art and, with the hindsight benefit of the Applicant's disclosure, attempt to reconstruct the invention.

Orthopedic Equipment Inc. v. U.S., 217 U.S.P.Q. 193, 199 (Fed. Cir. 1983).

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There is no teaching, suggestion, or motivation in the Schramm, Malkamaki, or Fong references to store the packets for retransmission in a buffer memory incorporated into the transmitter, limit the number of retransmissions to an operator-defined integer value, and clear the buffer memory after the integer value is reached.

The Applicant's claimed invention in amended independent claim 1 on the other hand, recites:

A method for adjusting data modulation at a base station comprising:

receiving data from a higher layer ARQ mechanism at a transmitter for transmission;

formatting the received data into packets for transmission, each packet having a particular type of encoding/data modulation;

providing a physical layer ARQ mechanism performing steps including:

transmitting the packets;

storing the packets for retransmission in a buffer memory incorporated into the transmitter;

monitoring a return channel for receipt of an acknowledgment for each packet that the packet has been received;

limiting the number of retransmissions to an operator-defined integer value;

clearing the buffer memory after the integer value is reached; and

retransmitting a packet at the transmitter, if an acknowledgment for that packet has not been received; wherein the physical layer ARQ mechanism operates transparently with respect to the higher layer ARQ mechanism.

which is neither taught nor suggested by the Schramm, Malkamaki, or Fong references. Accordingly, the Applicant's claimed invention as recited in amended

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independent claim 1 is patentably distinct from the Schramm, Malkamaki, and Fong references, whether taken alone or in any combination with one another.

The Applicant's claims 2, 5, 6, and 10 depend either directly or indirectly from Applicant's patentable independent claim 1, and are therefore patentable for at least the same reason as Applicant's patentable amended independent claim 1.

In addition, the Applicant's dependent claim 10 recites a method "wherein the physical layer ARQ mechanism reduces retransmissions required by the higher layer ARQ mechanism" which is not taught nor suggested in the Schramm, Malkamaki, or Fong references, whether taken alone or in any combination with one another. Therefore, the Applicant's dependent claim 10 is patentable for this reason as well as its dependence from Applicant's patentable amended independent claim 1.

35 U.S.C. §103(a) – Claim 3

The Examiner rejected claim 3 under 35 U.S.C. §103(a) as being unpatentable over Schramm et al. (U.S. Ref. No. 6,208,663) in view of Malkamaki et al. (U.S. Ref. No. 6,735,180) and Fong et al. (U.S. Ref. No. 6,760,860), and further in view of Agee (U.S. Ref. No. 6,128,276). In making the rejection, the Examiner stated:

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Schramm in view of Malkamaki and Fong discloses all the claim limitation sas stated above except for: the packets are transmitted using an OFDMA air interface in which frequency sub channels in an OFDMA set may be selectively nulled.

Agee teaches a radio communication method that is compatible with discrete multiple tone and orthogonal frequency-division multiplex-like frequency channelization techniques (column 4, line 19-column 5, line 40).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to add a method that transmits packets using an OFDMA air interface, such as that suggested by Agee, in the method of Schramm in order to allow stationary and linear channel distortion to be modeled as an exactly multiplicative effect on the transmit spreading code.

As stated previously, neither the Schramm, nor the Malkamaki, nor the Fong references teach or suggest storing the packets for retransmission in a buffer memory incorporated into the transmitter, limiting the number of retransmissions to an operator-defined integer value, and clearing the buffer memory after the integer value is reached as is recited in Applicant's patentable amended independent claim 1. Moreover, the Agee reference fails to cure these deficiencies in the Schramm, Malkamaki, and Fong references.

Accordingly, since claim 3 indirectly depends from Applicant's patentable amended independent claim 1, it is patentable for at least the same reason as Applicant's patentable amended independent claim 1.

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35 U.S.C. §103(a) – Claim 4

The Examiner rejected claim 4 under 35 U.S.C. §103(a) as being unpatentable over Schramm in view of Malkamaki and Fong as applied to claim 1, and further in view of Birru (U.S. Ref. No. 2002/0037058). In making the rejection, the Examiner stated:

Schramm in view of Malkamaki and Fong discloses all the claim limitations as stated above. Further, Schramm discloses that the invention is applied to all types of access methodologies including FDMA, TDMA, CDMA and hybrids thereof. However, Schramm does not expressly disclose wherein the packet are transmitted using a single carrier having a frequency domain equalization (SC-FDE) air interface.

Birru teaches that a multi-standard demodulator, which includes COFDM, a frequency domain equalizer for single carrier results in a cost-effective solution compared to a time domain equalizer.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use SC-FDE, such as that suggested by Birru, in the multi-access methodologies of Schramm in order to provide cost effectiveness and multi-path performance (0059).

As stated previously, neither the Schramm, nor the Malkamaki, nor the Fong references teach or suggest storing the packets for retransmission in a buffer memory incorporated into the transmitter, limiting the number of retransmissions to an operator-defined integer value, and clearing the buffer memory after the integer value is reached as is recited in Applicant's patentable amended independent claim 1. Moreover, the Birru reference fails to cure these deficiencies in the Schramm, Malkamaki, and Fong references.

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Accordingly, since claim 4 depends from Applicant's patentable amended independent claim 1, it is patentable for at least the same reason as Applicant's patentable amended independent claim 1.

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The Applicants thank the Examiner for his consideration and believes the application is in condition for allowance. Early and favorable reconsideration is respectfully solicited.

If the Examiner has any questions, or believes that a telephone conference would advance the prosecution of this application, the Examiner is requested to contact the Applicants' undersigned attorney.

Respectfully submitted,

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